the astrogram

VOLUME XII
NUMBER 10
March 12, 1970

National Aeronautics and Space Administration • Ames Research Center, Moffett Field, California

Open Season for Federal Life Insurance

The open season for Federal Group Life Insurance is being held for employees throughout the month of March.

At this time employees who have regular insurance, but declined optional insurance, may sign up for the optional insurance at new low rates. Employees who do not have any group life insurance because coverage was waived entirely, may sign up for regular plus optional insurance during the month of March.

Leaflets explaining the open season opportunity were distributed last week.

To change enrollment or to enroll, a Standard Form 176 "Election, Declination, or Waiver of Life Insurance Coverage" must be filed. Send completed form to the Records and Reports Section, Mail Stop, 241-5, no later than March 31.

Forms and leaflets may be obtained by calling ext. 2411.

Student Science Contest at Ames

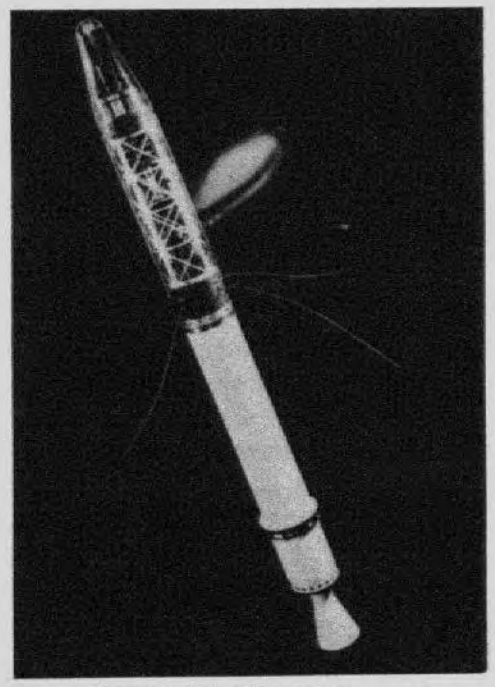
Eighty top science students representing 40 high schools in the area met at Ames last month for the Second Annual Santa Clara Valley Science Contest.

Sponsors of the event this year were the Santa Clara Valley Science Teachers Association, the Joint Council on Science and Mathematics Education, and the San Francisco Section of the American Institute of Aeronautics and Astronautics (AIAA). Ames is a member of the Joint Council and is represented by Garth Hull, Educational Services Officer of the Public Affairs Office.

The program opened with a welcome to the students by Charles Martin, General Chairman of the Science Contest.

The science test was the main item on the agenda and had a time limit of one-and-one-half hours. There were 121 questions with a total value of 274 points. In reviewing the examination many of the experienced scientists admitted they could be stumped by some of the questions. Here, for example, is the first one: "If the altitude of Polaris is 47 degrees, what is the observer's latitude?"

Technical briefings for the students followed the examination with Robert Sammons of the Ames Hypersonic Free-Flight Branch as AIAA host. Participants were Mark Kelly, Chief of the Large-Scale Aerodynamics Branch, and David Hickey, Assistant Branch Chief; Kizhanatham Raman, Structural Dynamics Branch; and Joel Mendoza, Vehicle Aerodynamics Branch.



FIRST SATELLITE. . .Explorer I, the first U.S. satellite in space, is still orbiting the Earth after more than 12 years-but it probably won't live to be thirteen. Predictions are that it will reenter the Earth's atmosphere and disintegrate sometime in May 1970.

Ames members of the AIAA serving as proctors were William Davy, Hypersonic Free-Flight Branch, and Kenneth McAlister, Hypersonic Aerodynamics Branch.

The program closed with announcement of the contest winners and presentation of awards. The first place award, a $100 Savings Bond, was won by science student Philip Dreike of Homestead High School with a score of 217 points out of 274. David Lambert of Awalt High School was second place winner. His prize was a $50 Savings Bond. Homestead High won the team award with Dreike in first place and Allen Baum in third place.

An added reward for the three top

(Continued on Page 4)

Ames–Stanford External Sonar Monitor Checks Heart Funtions

Scientists from the Stanford Universtiy School of Medicine and NASA-Ames successfully tested a new application of sonar (often called ultrasound) that can pry out secrets about the functioning of the human heart.

The new use of sonar, reported recently at the meeting of the American College of Cardiology, New Orleans, can provide fundamentals of the heartbeat and blood circulation heretofore unobtainable without passing a catheter (a long thin tube) into one of the heart chambers.

That procedure, known as cardiac catheterization, requires many hours and the patient is usually hospitalized. Additional laborious procedures involve the taking of X-rays and blood samplings.

By contrast, ultrasound studies of the heart can be done by a well-trained person in the physician's office or at the patient's bedside in a matter of minutes. The technique can be applied as a screening procedure for patients with known or suspected heart disease. And it can be used to monitor precisely the heart's healing process in patients recovering from open heart surgery or from a heart attack.

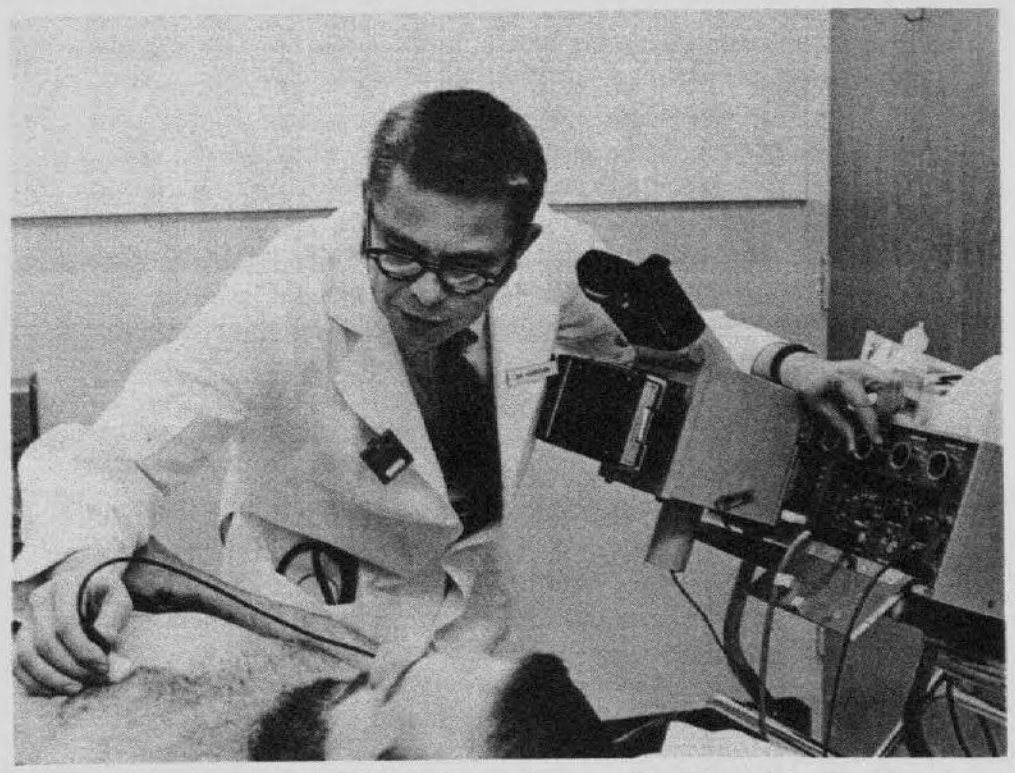
Unlike standard monitoring devices, sonar measures precisely the amount of blood which is pumped out of the heart at each contraction of the heart muscle. It also measures the heart size and the backward flow of blood which indicates that the patient has a defective heart valve.

The Stanford and Ames researchers conducted sonar studies in 51 patients undergoing standard catheterization. Their findings, obtained by ultrasound, correlated "reasonably well" with the degree of heart diesase detected by the standard method, they reported.

The work began as a result of interest by the Ames Biotechnology Division in ultrasonics as one of several techniques for using external instrumentation for medical research during manned space flights, and coincided with interest in ultrasonics at Stanford.

The new use of sonar was described by Dr. Richard L. Popp, a postdoctoral fellow in cardiology at the Stanford University School of

(Continued on Page 3)



A HEART IS CHECKED BY SONAR . . . Dr. Donald C. Harrison of the Stanford University School of Medicine demonstrates use of sonar on a medical student posing as a patient. Transducer on patient's chest transmitts and receives sonic impulses bounced against heart's interior walls. Camera on equipment takes picture of ultrasonic echoes which provide information about heart beat and blood circulation. The new use of sonar was adapted by Stanford physicians and biomedical scientists at Ames.

President Nixon's Statement On Goals of Space Program

Ed. Note:
The following is the statement in its entirety made Sunday, March 7, by President Nixon on the future of the space program.

"Over the last decade, the principal goal of our nation's space program has been the Moon. By the end of that decade men from our planet had traveled to the Moon on four occassions and twice they had walked on its surface. With these unforgettable experiences, we have gained a new perspective of ourselves and our world.

"I believe these accomplishments should help us gain a new perspective of our space program as well. Having completed that long stride into the future which has been our objective for the past decade, we must now define new goals which make sense for the seventies. We must build on the successes of the past, always reaching out for new acheivements. But we must also recognize that many critical problems here on this planet make high priority demands on our attention and our resources. By no means should we allow our space program to stagnate. But--with the entire future and the entire universe before us--we should not try to do everything at once. Our approach to space must continue to be bold--but it must also be balanced.

"When this administration came into office, there were no clear, comprehensive plans for our space program after the first Apollo landing. To help remedy this situation, I established in February of 1969 a Space Task Group, headed by the Vice President, to study possibilities for the future of that program. Their report was presented to me in September. After reviewing that report and considering our national priorities, I have reached a number of conclusions concerning the future pace and direction of the nation's space efforts. The budget recommendations which I have sent to the Congress for fiscal year 1971 are based on these conclusions.

THREE GENERAL PURPOSES

"In my judgment, three general purposes should guide our space program. One purpose is exploration. From time immemorial, man has insisted on venturing into the unknown despite his inability to predict precisely the value of any given exploration. He has been willing to take risks, willing to be surprised, willing to adapt to new experiences. Man has come to feel that such quests are worthwhile in and of themselves--for they represent one way in which he expands his vision and expresses the human spirit. A great nation must always be an exploring nation if it wishes to remain great.

"A second purpose of our space program is scientific knowledge--a greater systematic understanding about ourselves and our universe. With each of our space ventures, man's total information about nature has been dramatically expanded; the human race was able to learn more about the Moon and Mars in a few hours last summer than had been learned in all the centuries that had gone before. The people who perform this important work are not only those who walk in spacesuits while millions watch or those who launch powerful rockets in a burst of flame. Much of our scientific progress comes in laboratories and offices, where dedicated, inquiring men and women decipher new facts and add them to old ones in ways which reveal new truths. The abilities of these scientists constitute one of our most valuable national resources. I believe that our space program should help these people in their work and should be attentive to their suggestions.

"A third purpose of the United States space effort is the practical application--turning the lessons we learn in space to the early benefit of life on Earth. Examples of such lessons are manifold; they range from new medical insights to new methods of communications, from better weather forecasts to new management techniques and new ways of providing energy. But these lessons will not apply themselves; we must make a concerted effort to see that the results of our space research are used to the maximum advantage of the human community.

A CONTINUING PROCESS

"We must see our space effort, then, not only as an adventure of today but also as an investment in tomorrow. We did not go to the Moon merely for the sport of it. To be sure, those undertakings have provided an exciting adventure for all mankind and we are proud that it was our nation that met this challenge. But the most important thing about man's first footsteps on the Moon is what they promise for the future.

"We must realize that space activities will be a part of our lives for the rest of time. We must think of them as part of a continuing process--one which will go on day in and day out, year in and year out--and not as a series of separate leaps, each requiring a massive concentration of energy and will and accomplished on a crash timetable, our space program should not be planned in a rigid manner, decade by decade, but on a continuing flexible basis, one which takes into account our changing needs and our expanding knowledge.

"We must also realize that space expenditures must take their proper place within a rigorous system of national priorities. What we do in space from here on in must become a normal and regular part of our national life and must therefore be planned in conjunction with all of the other undertakings which are also important to us. The space budget which I have sent to Congress for fiscal year 1971 is lower than the budget for fiscal year 1970, a condition which reflects the fiscal constraints under which we presently operate and the competing demands of other programs. I am confident, however, that the funding I have proposed will allow our space program to make steady and impressive progress.

SIX SPECIFIC OBJECTIVES

"With these general considerations in mind, I have concluded that our space program should work toward the following specific objectives:

1. We should continue to explore the Moon. Future Apollo manned lunar landings will be spaced so as to maximize our scientific return from each mission, always providing, of course, for the safety of those who undertake these ventures. Our decisions about manned and unmanned lunar voyages beyond the Apollo program will be based on the results of these missions.

2. We should move ahead with bold exploration of the planets and the universe. In the next few years, scientific satellites of many types will be launched into Earth orbit to bring us new information about the universe, the solar system, and even our own planet. During the next decade, we will also launch unmanned spacecraft to all planets of our solar system, including an unmanned vehicle which will be sent to land on Mars and to investigate its surface. In the late 1970s, the "Grand Tour" missions will study the mysterious outer planets of the solar system--Jupiter, Saturn, Uranus, Neptune, and Pluto. The positions of the planets at that time will give us an unique opportunity to launch missions which can visit several of them on a single flight of over three billion miles. Preparations for this program will begin in 1972. There is one major but longer range goal we should keep in mind as we proceed with our exploration of the planets. As a part of this program we will eventually send men to explore the planet Mars.

3. We should work to reduce substantially the cost of space operations. Our present rocket technology will provide a reliable launch capability for some time. But as we build for the longer-range future, we must devise less costly and less complicated ways of transporting payloads into space. Such a capability--designed so that it will be suitable for a wide range of scientific, defense and commercial uses--can help us realize important economies in all aspects of our space program. We are currently examining in greater detail the feasibility of re-usable space shuttles as one way of achieving this objective.

4. We should seek to extend man's capability to live and work in space. The experimental space station (XSS)--a large orbiting workshop--will be an important part of this effort. We are now building such a station--using systems originally developed for the Apollo program--and plan to begin using it for operational missions in the next few years. We expect that men will be working in space for months at a time during the coming decade.

5. We should encourage greater international cooperation in space. In my address to the United Nations last September, I indicated that the United States will take positive, concrete steps 'toward

Ames Employee Aids VA Blind Program

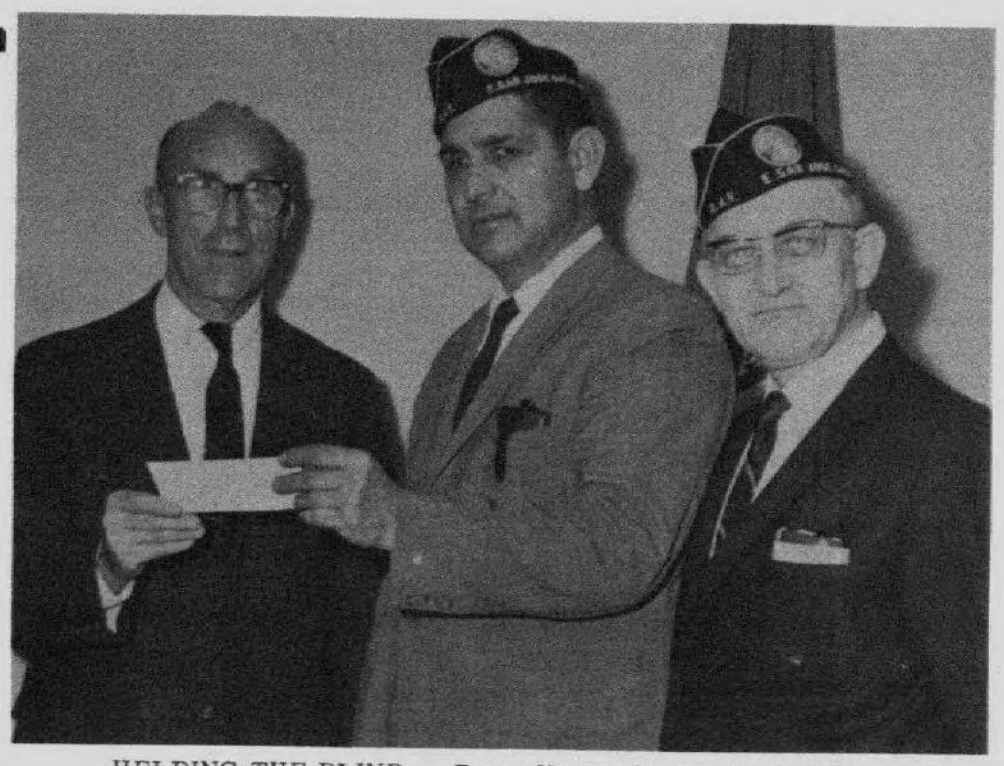
Family members of blinded veterans are being helped through a program sponsored by the Disabled Veterans of America (DAV) Chapter 114, East San Jose, commanded by Roger Hernandez of the Ames Reproduction Services Branch.

Working with the staff of the Western Blind Rehabilitation Center of the Veterans Administration Hospital, Palo Alto, Mr. Hernandez and members of his chapter are participating in many activities initiated for blinded veterans.

Of special interest to the DAV chapter is the "Family Training Program" at the Blind Center which was initiated by Mr. Hernandez and his vice commander, Walter G. Spohn. This is a program designed to bring sighted family members of blinded veterans to the Center for approximately one week to receive orientation and training similar to that received by the veterans themselves. It helps the family to adjust to the blindness of the veteran and provides the attention and information each needs.

Under the guidance of Commander Hernandez, DAV Chapter 114 was instrumental in bringing the need to rehabilitate family members of blinded veterans to the attention of the DAV Salvage Corporation of San Jose. In turn, that organization has underwritten the program and is now providing funds for lodging, meals and local transportation for family members of each veteran during a one week training period.

According to Dr. Abraham M. Gottlieb, VAH Director, the program is providing solutions to some of the oldest and most difficult programs at the Blind Center and has greatly increased the effectiveness of the rehabilitation program.



HELPING THE BLIND... Roger Hernandez (center) of the Ames Reproduction Service Branch and Commander of Chapter 114, Disabled American Veterans, San Jose, presents a check to Dr. Abraham Gottlieb (left), Director of the Veterans Administration Hospital in Palo Alto, to be used for a "Family Training Program" in conjunction with the rehabilitation of blinded veterans. Working with the staff of the VA's Western Blind Rehabilitation Center Mr. Hernandez and Walter Spohn (right), vice commander of DAV Chapter 114, recognized the need to rehabilitate family members of blind veterans. A one week training program was established for family members and through their efforts the DAV Salvage Stores provide funds for lodging, meals, and local transportation.

PRESIDENT NIXON'S STATEMENT

(Continued from Page 2)

internationalizing man's epic venture into space--an adventure that belongs not to one nation but to all mankind.' I believe that both the adventures and the applications of space missions should be shared by all peoples. Our progress will be faster and our accomplishments will be greater if nations will join together in this effort, both in contributing the resources and in enjoying the benefits. Unmanned scientific payloads from other nations already make use of our space launch capability on a cost-shared basis; we look forward to the day when these arrangements can be extended to larger applications satellites and astronaut crews. The administrator of NASA recently met with the space authorities of Western Europe, Canada, Japan and Australia in an effort to find ways in which we can cooperate more effectively in space. We have much to learn about what man can and cannot do in space. On the basis of our experience with the XSS, we will decide when and how to develop longer-lived space stations. Flexible, long-lived space station modules could provide a multi-purpose space platform for the longer-range future and ultimately become a building block for manned interplanetary travel.

6. We should hasten and expand the practical applications of space technology. The development of Earth resources satellites--platforms which can help in such varied tasks as surveying crops, locating mineral deposits and measuring water resources--will enable us to assess our environment and use our resources more effectively. We should continue to pursue other applications of space-related technology in a wide variety of fields, including meteorology, communications, navigation, air traffic control, education and national defense. The very act of reaching into space can help man improve the quality of life on Earth.

"It is important, I believe, that the space program of the United States meet these six objectives. A program which achieves these goals will be a balanced space program, one which will extend our capabilities and knowledge and one which will put our new learning to work for the immediate benefit of all people.

NEW HISTORIC ERA

"As we enter a new decade, we are conscious of the fact that man is also entering a new historic era. For the first time, he has reached beyond his planet; for the rest of time, we will think of ourselves as men from the planet Earth. It is my hope that as we go forward with our space program, we can plan and work in a way which makes us proud both of the planet from which we come and of our ability to travel beyond it."

SONAR MONITOR

(Continued from Page 1)

Medicine, and Dr. Donald C. Harrison, associate professor and chief of cardiology at Stanford. Working with them on the project is Dr. Harold Sandler, chief of the Biomedical Research Branch at Ames.

The Stanford work is supported by grants from Ames, the National Institutes of Health and the American Heart Association.

NASA is seeking devices to collect and record information on human heart action during space flights, according to Dr. Sandler. Now that the use of sonar in heart monitoring has proved its value, work will begin to build ultrasound devices small enough to be carried in orbiting space laboratories.

In addition, scientists will study the use of computers for storage, retrieval and instant interpretation of ultrasound recordings received on Earth.

The instrumentation work will be done by researchers at Ames. Testing of the new devices in human patients will be conducted by Dr. Harrison and his associates at Stanford.

The sonar recordings on heart patients in the recent Stanford study were made by using a commercially available machine which emits and receives high-frequency sound waves.

As sonic impulses were bounced against front and rear walls of the heart, they were recorded and converted into electrical signals which were displayed on a television screen.

From the patterns of ultrasonic echoes, taken when the heart is relaxed and when it contracts the researchers developed a formula enabling them to calculate precisely the volume of blood ejected by the heart, and also determine the presence of abnormalities.

Dr. Harrison said that from a medical standpoint the technique is promising and warrents further investigation to refine it "because it is painless, simple and safer, and less costly to the patient than present mehtods."

Ultrasound is also being used at Stanford to detect heart changes that lead to early rejection in heart transplant patients.

The Astrogram

Room 134
Admin. Mgt. Building
Phone 2385

The Astrogram is an official publication of the Ames Research Center, National Aeronautics and Space Administration, Moffett Field, California, and is published bi-weekly in the interest of Ames employees.

Editor . . . . . Dot Evans
Reporters . . . . . NASA Employees

Deadline for contributions:
Thursday between publication dates

WANT ADS

For Sale-VW Microbus full-length roof rack and spare tires and rims. Call Gary, 732-3055.

For Sale-1965 VW-Excellent condition, just 30,000 miles, $800. Call Linda Vollenweider, 257-6093.

For Sale-62 Mecury Montery S-55 390 C.I.D., power steering, brakes & windows, auto. trans., ex. cond. Call 948-7971 after 5 p.m.

For Sale-69 MGB Roadster, like new, 12,000 miles, $2485. Call 293-6486.

For Sale-61 Chev. Impala, 2 dr. H.T./AT radio, good running cond., $225. Call 356-9695 after 4:30.

For Sale-1962 Ford Station wagon, 6 pass., power steering, power brakes, air conditioning, new auto. trans., $350/offer. Call 245-0073.

For Sale-10 1/2 foot Chinook camper, 1968 model, fully self-contained, used very little, $2100. For complete information call Jack Clementson, 243-9078 Monday through Thursday after 4:30.

For Sale-High performance sailing 26' Trimaran, 17 foot beam, sloop rigged, main, 125% Genoa, working jib, 25 HP Evinrude, full 12v electrical system, two batteries, wired for dockside 110v, head, one burner alcohol stove, sink, 10 gal fresh water tank, fathometer sumlog, Danforth, bulkhead mounted compass, 80 watt Pierce-Simpson radio with 8 crystals, suitable for cruising or racing, $12,500. For more information call Jack Clementson, 243-9078 Monday through Thursday after 4:30.

For Sale-Sail Boat, 16' Melody, fully equipt., glass over plywood, Sears Tilt trailer, also 4' x 8' box for hauling, $395. Call Videll, 243-7408.

For Sale-16 ft. Aristocrat trailer, Land Commander, excellent cond., tires like new, $1,050. For information call 867-9496.

For Sale-Complete Drum set (Jazzmaster), new, never used, $100. Call 253-1703 evenings.

For Sale-Women's skiing equipment, Alburg skis, Cubco step-in safety bindings, Henke boots (size 7), boot tree, complete set $70. Never been used. Call 328-3409 after 5 p.m.

For Sale or Trade-150 gal. fiberglass-wood Aquarium, good for salt or freshwater fish, 5 1/2 ft. long, 2 ft. high, 20 in. deep, $100 or trade for smaller show tank, 77 gals. or larger. Call Ron Sauro, 227-6367 after 5 p.m.

For Sale-Bicycle exerciser, vibrator massage machine, both for $30. Call 253-1703.

For Sale-Girls white tap shoes, size 7, narrow, $5; girls black tap shoes, size 1, $2.50; girls sting ray bicycle, 20", $15; 14 ft. wood and fiberglass boat with trailer, without motor, $250., with motor, $500. Call Frank Thompson, 379-9426.

For Sale-1968 AMX #1001 390 engine, Select shift trans., PS, almost new condition, 50,000 mile warrenty, $2600. Call Ron Sauro, 227-6367 after 5 p.m.

For Sale-Astronomical Telescope, f/12, 6 inch reflector, includes: equatorial mount, eye piece holder, eyepieces, finder scope, Barlow lens and literature, $100. Call J. Patterson, 377-5954.

For Sale-Two olive green naugahyde reclining rockers, three stage reclining positions, both in very good condition, almost brand new, will sell for $60 each. Call 379-6836 after 4:30 p.m.

For Sale-Standard size double bed, Fruitwood, Mediterranean style, practically new, $35. Innerspring mattress and box spring, very good condition, $15 for both. Call Bud Hult, 356-2693.

For Sale-Gas stove, 4 burner, clock-light, large oven, $35. Call 293-6486.

For Sale-2 windows, $40, aluminum frames, size 4'x8'. Call Cliff Jern, 248-7634.

For Sale-Electric Brake controller, Kelsey-Hayes, with 12-6 voltage reducer, $10. Call Brooks, 356-9695.

For Sale-10" table saw with stand & table extention, ex. cond., extra blade, $125. Call 941-4148.

For Sale-Thunderbird, 1963, 2 door, HT, all power, good condition, good tires, $895. Call V. Nicholson, 326-0204.

Wanted-Medium size motor cycle, will pay $150. Call 964-0750 after 6 p.m.

Wanted-35 mm Enlarger. Call 266-4883 after 6 p.m.

AMES LEGAL OFFICE HONORED. . . In a ceremony attended by principal attourneys from the NASA Office of General Counsel, the entire Ames Legal Office was recently commended for providing legal services to indigent persons who qualify under programs administered by the Legal Aid Society of Santa Clara County. Individual "Certificates of Commendation" which are shown here, were awarded by the Legal Aid Society to all ARC attourneys including patent counsel in recognition of their services to the poor.

Participants in the award ceremony which was held at the office of the Society were (l to r) J. Henry Glazer, NASA-Ames Chief Counsel; John A. Whitney, NASA Asistant General Counsel for Procurement; William H. Penaat, Counsel Santa Clara Legal Aid Society; James A. Lande, NASA-Ames Counsel; and S. Neil Hosenball, NASA Deputy General Counsel. Since attourneys from the ARC Patent Counsel's office were attending a patent conference away from Ames the awards on their behalf were accepted by Mr. Glazer.

SCIENCE CONTEST
(Continued from Page 1)

contest winners and their teachers is an invitation to attend a dinner meeting of the AIAA San Francisco Chapter to be held at the Old Plantation on Tuesday, March 24. Guest speaker will be Albert J. Kullas, Vice President of Martin-Marietta in Denver and Manager of the Viking Project. The subject of his talk is "Planetary Exploration."

Special Discounts Offered to Personnel at Ames

NEW ITEM:

MICHAEL'S JEWELRY: Special through June-Diamonds all sizes and qualities cost plus 10%.

SAN JOSE SYMPHONY: 50¢ discount on $3.50 seats, Friday, March 20. Call The Astrogram Office.

Wanted-Female roommate to share 1 bedroom apartment for 4 months. Call Janice, 739-0549.

Wanted-Room for mature man. Ames employee reassigned from Philadelphia. Call Don Schilling, ext. 2023.

Missing-Mutimeter, digital Fairchild, model 7050, decal #33656. Also, Current source, Keithley 261 (Pico-ampers, standard) decal #30236.

Lost-Raincoat, lightweight, in Ames cafeteria coatroom on Wed. Mar. 4. Probably taken by mistake. One of similar appearance was left on rack. Please call extension 2236 or 948-7247.

BOWLING

. . . by Clark White

The current standings of the All-Ames Bowling League are:

DIVISION I	WON	LOST
Keggers	19	9
Comets	18	10
4NI	18	10
Machine Shop	18	10
Glitches	12	16
Road Runners	11 1/2	16 1/2
Owls & Pussycats	9	19
Splitters	6 1/2	21 1/2
DIVISION II		
Woodchoppers	18	10
MAD	18	10
Timber Topplers	17	11
Sterling Engineers	15	13
Double Trouble	14	14
Killers	13	15
Hit and Mrs.	9	19
Wal-Nut-O's	8	20

Bowled March 4:

Men's high series: Cal Eddleman, 585; and George Rathert, 569.

Women's high series: Phyllis White, 455; and Winnie Malloy, 454.

Men's high games: Dick Parker, 224; and Cal Eddleman, 211.

Women's high games: Ann Teshima, 189; and Nancy Gowan, 165.

Ames Airings

. . . by Jane Kohler

The annual Ames ski trip over the Washington's Birthday holiday was a success again this year according to Honcho RALPH MAINES (Security). Thirty-seven skiers had sunshine and packed powder snow at Squaw Valley all three days and many returned with suntans. One of the firsts during the trip was that 10-year-old Shelia Katzen, daughter of ELLIOTT KATZEN (Hypersonic Aerodynamics Branch) came all the way down the mountain for the first time. Another member of the group, BARBARA PERRYMAN (Public Affairs) distinguished herself by forgetting to get off the chairlift and had to ride the chair both ways. Saturday and Sunday nights there was a spectacular torchlight parade down Red Dog slope. Ralph Maines would like to thank and congratulate everyone for being punctual which helped make the trip more enjoyable for everyone. . . BOB VITIELLO (Electrical Services) and his wife, KATHI (Employee Development) flew to Las Vegas on Friday, February 20, to see Elvis Presley at the International Hotel that evening. They stayed in Las Vegas for the night, saw the sights and flew home again Saturday night. . . Also in Las Vegas to see Elvis over the holiday weekend were ESTA BAKAS (Travel) and JOAN RZUCIDLO (Pioneer) who drove to Las Vegas on Saturday for the Sunday-night show. . . KAREN JOHNSON (Records Management) and her husband, Dennis, recently spent three days relaxing in a cabin near Lake Arrowhead and visiting her grandparents in Whittier. They spent a day at Disneyland where they ran into STEVE (Fluid Mechanics) and VICKI DEIWERT (Services and Supply) who were on their way to San Diego. The Johnson's headed home and the Deiwerts visited the San Diego Zoo, Sea World and then went to see friends. . . Also visiting Disneyland were VERN SCHRAMM (Biological Adaption) his wife, Deanna, and daughters, Julie, 5 and Nara, 2. They flew down for the day and had a great time. . .BOB JOHNSON (Wind Tunnel Installation) his wife, Audrey, and their four boys spent the holiday weekend camping at the Fort Bragg State Park. While there they took the diesel train, "The Skunk", to Willetts and back.

SOFTBALL

Anyone interested in playing for the NASA Ames Softball team which competes against various industries from the surrounding communities, please contact Bruce Ganzler, ext. 2747.

the astrogram

VOLUME XII
NUMBER 11
March 26, 1970

National Aeronautics and Space Administration • Ames Research Center, Moffett Field, California

Dr. Stein Named to Science Fair Board

Dr. Seymour N. Stein, Chief of the Ames Medical Office, has been elected vice president of the Santa Clara Valley Science Fair Board, according to a recent announcement by the board president Everett H. Layne of General Electric.

Dr. Stein began Science Fair participation as a judge in 1959, and served on the board of the Tri-Counties Science Fair (Ventura, Santa Barbara, San Luis Obispo) for four years, receiving a commendation plaque from the Ventura County Industry Education Council. Since 1964, he has judged each year in local, regional or international science fairs.

"A large segment of the scientific community is behind the Science Fair effort," Dr. Stein said, "because those responsible for the employment and management of scientists know how important it is for future scientists to become 'goal oriented' early in life, and further, how important it is for early development of manual as well as mental skills."

The Santa Clara Valley Science Fair will be held in April and according to Dr. Stein it is going to be "bigger, better and more exciting than any we've ever had before. The calibre of student our schools turn out is demonstrated in the winners of the 1969 SCVSF, and we are immensely proud of them."

REMINDER

NEBA Insurance Deadline April 1

Don't forget "open season" for NASA Home Life Insurance closes April 1.

Details of this NASA group life insurance plan, which is sponsored by the NASA Employees Benefit Association (NEBA) and underwritten by the Home Life Insurance Company of New York, were distributed early this month to all Ames employees.

The NEBA insurance plan is now in its 19th year with a membership of more than 18,000 staff members. Any full-time, permanent NASA employee is eligible to enroll. The amount of coverage depends on the employee's salary. For further details call the Employee Development Office, ext. 2033.

AIAA Holds Simulation Conference

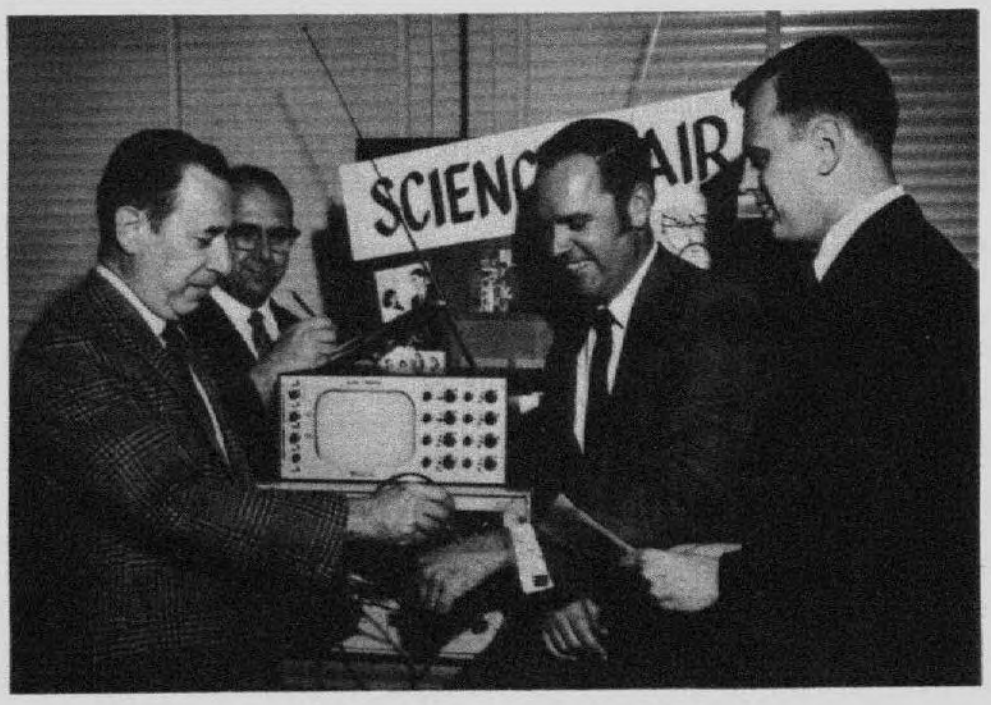
For the first time in five years a visual and motion simulation technology conference was held last week (March 16-18) at Cape Canaveral Florida. Sponsored by the American Institute for Aeronautics and Astronautics (AIAA) the conference was organized into four technical sessions and a panel discussion.

Visual and motion simulation, as it is known today, has only been possible during the past dozen or so years. It required the development of high speed digital computers, expanded analog computers, and the growth of the television industry to provide the capability to simulate the necessary aircraft, missile, and spacecraft characteristics. With this in mind the AIAA Conference was organized to provide information on the latest developments in visual and motion simulation. The four technical sessions were: Session I, "Flight Simulation-Experience and Needs;" Session II, "Motion Cues in Flight Simulation;" Session III, "Validation of Simulator Cues;" and Session IV, "Simulator Hardware Development." At the first session Ames research scientist Donald C. Dust, Simulation Experiments Branch, presented a paper on "Color Closed-Circuit Television as a Means of Providing Visual Cues in Simulation." This paper describes the equipment and techniques used at Ames to provide visual cues and discusses the necessity for their use during certain parts of the flight profile, such as during flare and touchdown.

At the second session John D. Stewart, a research scientist in the Man-Machine Integration Branch, gave a paper entitled "Implications of Some Recent Studies of Human Perception of Angualr Acceleration to Motion Simulation." His paper was a presentation of data on human subjective response to angular acceleration collected on the Ames Man-Carrying Rotation Device and the implications of these data to the perceptual system and to motion simulation.

The Flight Simulator for Advanced Aircraft (FSAA), the newest and most sophisticated piloted motion simulator at Ames, was discussed in detail at the final session by research scientist Joseph J. Zuccaro, Simulation Experiments Branch. This simulator's motion system provides six degrees of free-

(Continued on Page 4)



GRAND PRIZE JUDGES. . . for the 1970 Santa Clara County Fair visited the Center recently to discuss criteria with Dr. Seymour Stein (left), newly elected vice president of the Science Fair Association and Chairman of the Grand Prize judges. From left are Dr. Stein, Maurice Whitlock, UTC; Kenneth Thompson, Ampex; and Robert Billner, National Semi-Conductor Co. Dr. Stein is demonstrating a device designed by Sal Rositano, Research Instrumentation Branch, which measures blook flow in vessels and displays it on an oscilloscope screen.

President Nixon Commends Two Ames Researchers

John Dimeff, Chief of the Instrumentation Division, and Jack M. Pope of the Electronics Research Branch, were surprised and pleased last week when they each received a letter from the White House signed by the President of the United States commending them for their development of a breathing sensor to monitor windpipe obstructions in persons who have undergone tracheotomies.

In the letter President Nixon cited the two men for their work and said, "I understand that your are responsible for this important invention, which is expected to enable many patients to recover from surgery at home instead of in hospitals.

"It is a great pleasure to commend you for your excellent work and to wish you continued success in the years ahead."

The letter from the President to the two Ames researchers is the result of a program to recognize outstanding contributions made to the general improvement of life in the United States.

Voter Registration At Ames April 1

Ames employees who are residents of Santa Clara County and are eligible to vote in the June Primary will have an opportunity to register at the Center on April 1 from 11:30 a.m. to 1 p.m. At that time two members of the League of Women Voters representing the Los Altos - Mountain View area will have a registration booth in the Cafeteria throughout the lunch period. They will answer questions concerning registration requirements and are qualified to register all eligible voters.

The League of Women Voters is a nonpartisan group which is working throughout the country in an effort to stimulate more citizens to take part in the election of officials at all levels of government. This year their motto is, "Vote and the choice is yours; don't vote and the choice is theirs."

DIRECTOR'S ANNUAL REPORT TO CENTER STAFF

Ed. Note:

The following is the annual report in its entirety as presented by Dr. Hans Mark, Ames Director, on Friday, March 20.

"This meeting with you is intended as a progress report at the start of my sophmore year at the Center. The past year has been an eventful one for me, and I am grateful for the support I have received from all of you. I continue to be impressed with the intelligence and the energy with which you go about your work.

"In looking back at the past year, perhaps the most interesting incident was the circulation of the rumor a few months ago that the Center would be closed. Since we are still here, I am reminded of the statement Ernest Hemingway made after he was reported to have been killed in an air crash in Africa. After being rescued, he said that 'Reports of my recent demise are highly exaggerated'. I am pleased to say that the same is true for our Center.

"However, I think there is a lesson that we should all draw from this incident. As you may know, a few years after Hemingway's African accident he did die. He committed suicide. Institutions such as our Center can also commit suicide by not responding to challenges when they arise and by not maintaining the high quality of fundamental research work being done. I believe that no federal research laboratory should consider itself as possessing a guaranteed lease on life. Research laboratories must continue to perform valuable functions if they are to survive. So-called unique equipment is not enough. The U. S. Naval Radiological Defense Laboratory, which was closed last year, had an excellent equipment plant but when the laboratory did not adapt quickly enough to new missions it was closed. It is the people working in the laboratory and the ideas they generate that, in the long term, determine whether the institution is viable or not. I am sure that you all understand this point and as a consequence, no grass will grow under our feet.

ACHIEVEMENTS

"Before I become entirely engrossed in morbid speculations, let me outline a few of the important successful achievements of the past year. The Flight Simulator for Advanced Aircraft is now working and is beginning to be used for research programs. We are looking forward to an arrangement with the Federal Aviation Administration whereby some of their people will come to Ames to work with us on the FSAA on a permanent basis. I am also pleased to report that one of the first research projects on the FSAA was an effort involving a strong element of international collaboration. This program dealt with the simulation of the Concorde which, as you know, is a joint British-French effort to construct a supersonic transport airplane. The lunar magnetometer for Apollo 12 provided one of the most important and unexpected scientific results of the mission. The magnetic field measured on the lunar surface at the Apollo 12 site was considerably larger than expected. When compared with magnetic measurements made from lunar orbit, this result seems to indicate that the field measured on the surface may be a local phenomenon. As a result of the Apollo 12 flight a smaller hand-held magnetometer will be employed by the Apollo 14 astronauts to make a magnetic area survey of the Apollo 14 landing site. This incident illustrates that in spite of the enormous complexity of an Apollo mission we are flexible enough to introduce a new experiment when demanded by the scientific questions to be answered. Finally the analysis of the lunar samples has been an exciting preoccupation for a number of Ames scientists. Although the results are negative both in terms of the chemical evolution and the life form detection experiment they are, nevertheless, important because of the care and precision employed by the principal investigators in obtaining the results. As a result of this care, Ames scientists are able to place much lower limits on the presence of certain compounds of importance to life forms than other investigators. The list of achievements by Center scientists is, of course, much longer. I have merely picked three representative samples to illustrate our vitality, and I apologize to those of you who are not included in the list.

PROBLEMS

" I would rather spend the remainder of the time here in discussing the problems I see in the future and to discuss with you some of the things we may do to solve the. When I spoke to you at this same time last year I cited the enormous impact of long range air transportation on our civilization. In the past three or four months many of us have been involved in trying to determine whether our aeronautical technology could have an equal or even greater impact on short-haul air transportation. This question is a very difficult and subtle one. There is a constant interplay between the recognition of a need and the development of a technology. It is a little bit similar to the question of what comes first; the chicken or the egg. Do you wait until a need is obvious and then develop the technology or do you work on technology hoping that the needs will appear? We are working very hard at the moment to assess the national needs in short-haul air transportation. I have a very strong feeling that requirements will be defined and that the need for new types of short-haul aircraft will become quickly apparent. Fortunately, because of the work of the Center's Advanced Aircraft Program Office the Center is in a very good position to take the lead in the development of these new aircraft.

FUTURE DEVELOPMENTS

"Let me now turn to some other important future developments. As you probably all know we are acquiring a large new C-141 airplane for the airborne telescope. There is little question in my mind that this flying observatory will be a uniquely important national facility. Infrared astronomy will be the primary mission of this observatory, and we have good reason to believe that this region of the electromagnetic spectrum may be the most important one in the astronomy of the next dacade. I believe that the understanding of Seyfert galaxies and quasars both of which are exceedingly energetic sources and also very rich in infrared emission will have profound cosmological consequences. In addition to its scientific value, the airborne observatory may also be used as an administrative testing ground for the operation of national facilities by NASA Centers and perhaps even as a prototype for the future operation of a space station by NASA.

"The Pioneer program which represents man's first attempt to explore planets beyond Mars is well on its way. We are on a very tight schedule and are beginning to grapple with some of the problems that follow as a consequence.

"It is of the utmost importance that we perform the Pioneer F and G missions successfully. Our ability to obtain important future space missions depends crucially on the success of this effort.

"In the biological sciences we have continued and expanded our interest in flying life detection experiments. This is clearly an important and most interesting scientific activity. We must do whatever we can to see to it that the Viking mission to Mars is successful. We are also working on the problem of developing the flight program for space biology. Here also critical thinking and bold imagination are required.

"I have every hope that Ames scientists will find ways of contributing to the Agency's earth resources program. We now have a committee which is engaged in preparing a final report on the nature of our participation in this field. The report is due next week, and I hope very much that some of the recommendations in the report can be implemented.

ADMINISTRATIVE CHANGES

Once again, I have not been able to give a complete list of future problem areas. I have simply chosen a sample of those which are probably the most important. In addition to the technical problems there have been a number of administrative changes in the past year. The most important of these is the establishment of the Directorate of Research Support with a mission of providing the technical services necessary for us to fulfill our research objectives. In the past year, we have organized program offices to lead our efforts in the Space Shuttle and Space Station programs. This method of organization is being tried to respond to new Agency programs in a rapid and, hopefully, effective way. I expect that both of these program offices will draw on the resources of our more discipline oriented line organizations for support. We are now in the process of reorganizing our library services and will modify

NASA Traveling Space Exhibit

Ames employees are invited to view the NASA traveling space exhibit on Saturday, March 28, from 10 a.m. to 4:30 p.m. at the host organization, Lockheed Missiles and Space Company, Sunnyvale. The "Craftsman Ship" is part of a nation wide effort to encourage quality workmanship in the production of the nation's space vehicles.

The message of the exhibit is that each person associated with the Apollo program bears a responsibility for the security of the astronaut's lives and the success of the Apollo mission.

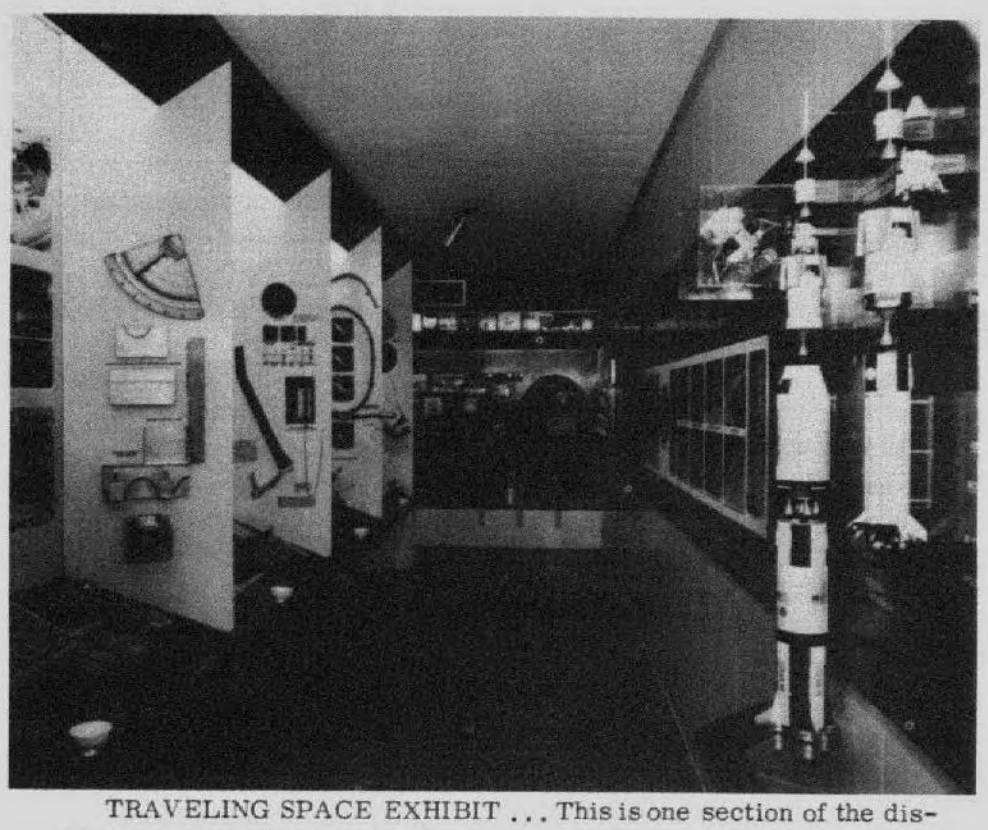
The "Craftsman Ship" is a van equipped with a variety of spaceage illustrations and materials. Viewers see pictures of the American astronaut team and a spacesuit of the type worn by astronauts.

A special display includes some of the 300 metal alloys and materials that go into the Saturn V and Apollo spacecraft.

Another display demonstrates how solar cells generate electricity in space. The van also has a cutaway liquid propellant space engine from the Saturn V Rocket and a liquid oxygen tank from the Apollo Spacecraft.

Other displays show how the spacecraft and launch vehicle are tested before going to Kennedy Space Center for launching. Working models of vital valves in the Apollo Saturn V, as well as models of space engines, are also on display.

The display van is made available by the Marshall Space Flight Center's Manned Flight Awareness Program. It will be on exhibit in the LERA Parking Lot off Mathilda at Lockheed.



TRAVELING SPACE EXHIBIT ... This is one section of the display on the "Craftsman Ship", a van equipped with a variety of space-age exhibts, which will be open to Ames employees at Lockheed, Sunnyvale, from 10 a.m. to 4:30 p.m., Saturday, March 28.

SECOND NOTICE

FPC Scholarships

The Federal Personnel Council of Northern California has announced the establishment of the ninth annual college level scholarship fund.

DEADLINE APRIL 1

Deadline for making application for the scholarship is April 1. Applications forms may be obtained by contacting Mrs. Evans or Mrs. Kohler, Room 134, Admin. Mgt. Building, ext. 2385.

SOFTBALL

Anyone interested in playing for the NASA Ames Softball team which competes against various industries from the surrounding communities, please contact Bruce Ganzler, ext. 2747.

ALL AMES SOFTBALL

The All-Ames intramural slow-pitch softball league is now organizing for the summer season. Several teams are short of players so if you would like to play on a full or part time basis, you are wanted.

Games are played on the Mountain View High School field after work on Tuesday, Wednesday, or Thursday, and no team plays more than one game a week.

This year the league is considering the possibility of hiring umpires, and is looking for people with umpiring experience who would be interested in umpiring one or two nights a week for a nominal fee. For information on participating as a player or umpire call Bill Pitts, ext. 2698.

DIRECTOR'S ANNUAL REPORT
(Contined from Page 2)

building N-202 in an appropriate way to provide a larger home for the Center's main library.

"The final administrative announcement is a difficult one for me to make. It concerns a gentleman for whom I have developed great respect in the short time I have known him. Mr. Russ Robinson, the Director of Aeronautics and Flight Mechanics, has informed me that he plans to retire sometime late this Spring. Fortunately, Ames has a very civilized tradition governing retirement functions so that you will all have the chance to express your best wishes personally to Russ. Let me start now by thanking Russ for the enormous contributions he has made to the development of the Ames Research Center. Our strong position in Aeronautics today is due in large measure to his efforts.

"In closing this first year's report to you, I see no reason to change the statement I made last year. We are fortunate in having some very challenging technical problems to work on and this presents us with most exciting prospects for the future. I am very pleased to be among you and to have the opportunity to work with you."

Stamp Club to Issue Apollo 13 Covers

NASA Manned Spacecraft Center Stamp Club will commemorate the flight of Apollo 13 with the issuance of a set of cacheted covers bearing the official mission emblem and postmarked, on the dates of launch, lunar landing and splashdown, at Houston. The Stamp Club has made it a tradition to publish covers for each flight, for presentation to the astronauts and for distribution to its own members. Non-members desiring to acquire these historic philatelic mementoes should send a stamped self-addressed envelope together with $1 for each set ordered, to the Secretary, MSC Stamp Club, Box 58328, Houston, Texas 77058.

Ames Recreation Association Formed

Do you have a favorite recrational activity you would like to pursue more actively with your friends? Is there a club you would like to see formed, like a rod and gun club ? What type of recreation facility would you like to see here at Ames? The NASA-Ames Recreation Association (ARA) has been organized to help you.

The ARA was recently established by authority of Ames Management Manual 3712.2. All government workers employed by NASA on the Center premises are automatically "regular" members of ARA. All retired Ames employees, their immediate families, and immediate families of regular members are "associate" members. All on-site Ames contractor employees and their immediate families are invited to participate in the activities of the ARA. The objective of this Association is to encourage, support and promote recreational activities for its members. The ARA is governed by a nine member executive board that will be elected by and from the regular members. The current board was appointed by Dr. Mark with directions to organize the ARA and conduct an election for the representative executive board.

The election of a representative ARA executive board will be held April 6.

The recreational activities which the ARA will "encourage, support, and promote" are up to you, its members. If you would like to organize an activity and feel there is enough interest for the organization to function successfully, then get together with your friends, make plans, estimate your annual funding needs, and submit your proposal to your executive board. Plans are under way for the first annual budget, so get your ideas in as soon as you can. If you have any questions regarding procedures for submitting proposals contact Frank Prior or any of the other board members.

This organization has been a long time coming and has the promise of giving a real "shot in the arm" to Ames Recreation activities. But, all of us must lend support to develop it to its fullest. If you have any ideas for recreation facilities, programs, or clubs, don't wait for someone else to start the ball rolling. Send in your suggestions to the ARA board NOW!

Special Discounts Offered

FRONTIER VILLAGE: Unlimited rides for $2.50 thru March 29. Easter Egg Hunt on Saturday. Frontier Wonderland Club card holders only.

Ames Airings

. . . by Jane Kohler

AMES HAS A QUEEN---KATHLEEN HUFFMAN (Facilities), whose husband is serving with the U.S. Navy in Guam, was crowned by Terry McGovern, KSFO radio announcer and Master of Ceremonies at the St. Patrick's Day celebration of the Santa Clara County Irish Social Club. The crowning took place at the Alpine Lodge in San Jose. Kathleen was presented with an Irish plaque framed in walnut, a silver crown and a green carnation coursage which she said was lovely. Long live the queen!. . . TERRY GOSSETT (Guidance and Control Systems), his wife BUELA (formerly of Manuscript), daughter , Rhea, LLOYD CORLISS (Guidance and Control Systems), his wife, Jane, and son, Troy, recently rented a cabin in the Yosemite Lodge area to spend a weekend closer to the wilds of nature. Lloyd and Jane managed to get in some skiing at Badger Pass while they were there; good skiing the first day but on the second it was snowing and blowing quite a bit. Terry and Buela spent their time hiking around the valley, espically Mirror Lake. They did find that snow cones from real snow, not crushed ice, are refreshing and recommend that anyone going hiking in the snow carry paper cups and check with either Terry or Lloyd as to various recipes. The snowfall was especially exciting as it was the first time Rhea, 1, had ever seen it. She and Troy, 3, found it quite to their liking. . . ROY HAMPTON (RFE) recently returned to Ames after spending six months with the National Guard. Welcome back. . . BOB DAVIDSON (RFE) and Jacquelyn Stroh exchanged wedding vows February 28 in Reno, Nevada. The couple is now living in Sunnyvale. Best wishes to both. . . The engagement of BETTY RUPP (MAD, Special Projects) to TED BROWN (RFE) was announced recently by Betty's parents, Mr. and Mrs. Stanley Rupp of Campbell. A May wedding is planned.

JOGGERNAUTS

With the election of officers and adoption of by-laws the Ames Joggernauts have become a formalized organization. Officers include: Jim Woodruff, President; Ted Passeau, Vice President; and Paul Sebesta, Secretary-Treasurer. A one-dollar membership fee will be used to support the club in coming activities. The class for health and how to get started still meets Monday, Wednesday and Friday. Contact any club officer if you are interested.

BOWLING

. . . by Clark White

Current standings of the All-Ames Bowling League are:

DIVISION I	WON	LOST
Comets	25	11
Keggers	23 1/2	12 1/2
4NI	22	14
Machine Shop	19	17
Glitches	16 1/2	19 1/2
Owls & Pussycats	15	21
Road Runners	12 1/2	23 1/2
Splitters	10 1/2	25 1/2
DIVISION II		
Woodchoppers	23	13
Sterling Engineers	22	14
Timber Topplers	20	16
Double Trouble	19	17
MAD	19	17
Killers	14	22
Hit and Mrs.	14	22
Wal-Nut-O's	13	23

Bowled March 18:

Men's high series: Tony Astalfa, 598; Hank Cole, 596.

Women's high series: Jan Konrath, 488; Judy Long, 479.

Men's high games: Dean Jaynes, 232; Tony Astalfa, 222.

Women's high games: Jan Konrath, 197; Jeanne Clemson, 191.

SUMMER BOWLING

The All-Ames Summer Bowling League will be starting Tuesday, May 12, 6:30 p.m. at Moonlite Lanes in Santa Clara. The summer season will run through August 18, a total of 15 weeks. We need bowlers! Please sign up with Dennis Riddle (Pres.) at 2241/227-2 or Clark White (Vice Pres.) at 3132/210-9.

GOLF

. . . by Kay Bruck

The Oak Ridge Golf Tournament of the Ames Golf Club held March 14 was played in two flights. The chairmen for this tournament, Jim Nelan and Al Petretti, reported the following as winners in the best-ball twosomes:

First Flight: Jack Lee and Mitch Radovich, first place; tied for second and third place were Roy Griffin, George Falkenthal, Jim Rountree and Ron Dennison; fourth place, another tie, went to Fred Carpenter, Jim Nelan, Paul Kutler and Ray Einberger.

Second Flight: Ben Tyson and Tom Polek, first place; Russ Cravens and Fred Wirth,, second place; and tied for third and fourth place were Edie Watson, Bert Nevotti, Tim Bridges, and Jessie Gaspar.

Nearest to the pin on the 11th hole was taken by Spencer Shaw.

The next Ames tournament will be at Santa Teresa on April 4.

BASKETBALL

. . . by Phil Wilcox

The All-Ames Basketball League finished their regular season with a tie between BCA and Fighting Pumas. Each had 8 wins against 2 losses. The playoff between these two teams was played on Wednesday, March 11. A crowd of 100 fans was on hand to root for their team. The Pumas led at the end of the first quarter, but BCA fought bact to tie them at the half. The third quarter saw the Pumas out distance BC by 3 points. BCA was not able to overcome this lead. Final score was Fighting Pumas, 53 and BCA, 46.

BOX SCORES

Fighting Pumas

Player	FG	FT	PF	TP
T. Gossett	0	1	4	1
D. Sinnott	0	0	0	0
T. Carson	3	8	4	14
P. Haro	1	0	0	2
R. Hedlund	2	3	2	7
L. McCulley	5	10	5	20
K. Souza	0	0	0	0
M. Smith	1	0	3	2
J. Connolly	2	3	2	7
	14	25	20	53

BCA

G. Black	6	1	4	13
V. Nolan	0	3	3	3
D. Jones	0	0	1	0
B. Deisher	0	5	5	5
M. Izrailov	0	0	0	0
J. Streeter	2	4	1	6
T. Sacco	1	2	5	4
B. Cleveland	0	0	0	0
L. Tovani	1	1	2	3
R. Wieland	4	2	2	10
	14	18	23	46

Final Standings

	WON	LOST
Pumas	9	2
BCA	8	3
Jets	7	3
Madmen	4	6
Beer Barrels	2	8
ARO	1	9

Top Three Scorers for League:

D. Peterson	(B.B)	13.5
T. Carson	(F.P.)	10.2
G. Black	(BCA)	9.5

Officials this season were furnished by the Valley Officials Association. The management would like to thank all the players and fans for making this season a very enjoyable season.

The Astrogram

Room 134
Admin. Mgt. Building
Phone 2385

The Astrogram is an official publication of the Ames Research Center, National Aeronautics and Space Administration, Moffett Field, California, and is published bi-weekly in the interest of Ames employees.

Editor . . . . . Dot Evans
Reporters . . . . . NASA Employees

Deadline for contributions:
Thursday between publication dates

WANT ADS

For Sale-1967 VW Camper, excellent condition, $2395. Call Jim Monfort, 967-2443.

For Sale-1961 Ford F100 pick-up. 292 V8, radio, heater, power brakes, good 6 ply tires, aluminum camper shell, $675/offer. Call Ray Duke, 252-0386.

For Sale-68 Dodge Cornet, R/T, 440 Magnun, 4 sp., pos., many more options. Call 243-3086.

For Sale-Mustang 66 A/T, V8, Michelin tires, $1700 or best offer. Call 324-3980.

For Sale-1957 truck lnt., good conditon, sport liner canopy, $500. Call G. E. Brown, 252-2776.

For Sale-1965 MG1100 4 dr., new Michelin tires, $525. Call G. E. Brown, 252-2776.

For Sale-Canaries, 1 male (good singer), 2 females, small wooden aviary with divider and nests, all for $25. Call 243-4463.

At Stud-Chocolate Point Siamese cat, championship breeding, excellent disposition, $50. Call 253-4475.

For Sale-Hiking-rock climbing boots, Couette (Le Trapeur), size 9 medium, worn once, pd. $30, sell for $18.50; intercom system, $20; girl's desk, $20. Call 323-2080.

For Sale-3/4 size violin suitable for a child, excellent condition, complete with case, etc., $50. Call Ray Duke, 252-0386.

For Sale-120 watt FM stereo receiver, Fisher model 700T, walnut cabinet, never used, $350. Call 327-8548.

For Sale-J. B. Lansing oiled walnut speaker enclosure, 23x14x12 inches deep, takes 10 or 12 inch speaker plus tweeter, new $54, price, $40. Call 323-2080.

For Sale-10 acre parcels of recreation or investment land in the Nevada City, Grass Valley area of California. Lots of trees, excellent views, good access but still secluded. Some parcels border on National Forest. For more information call Leidigh, 591-0423 eves.

For Sale-Konica Zoom II, 8 mm movie camera, electric eye, Zoom, electric drive, 16, 24, 48 FPS, very good condition, cost $160 new, $40. Call Jerry Barrack, 263-1683.

For Sale-R. C. planes, engines, 5 Ch. citizenship digital propo with 4 servos. Get in touch with Phil Thompson, 525 Lynwood Ave., Apt. P, Mountain View.

For Sale-Car top carrier box, ideal for travel, camping, low profile, totally enclosed, with locking side doors, 6 ft. long, 4 ft. wide, 91/2 in. inside height, includes steel bars with gutter clamps. Call 961-6666.

For Sale-3 rattan bar stools, $7 each. One guitar, $15. Call 245-8419.

For Sale-G. E. Portable dishwasher, $125. Call Ralph Carmichael, 321-2016.

For Sale-Rural mail box with 6 ft. redwood post, 2 drawer, 3x5 metal card file. Tool Lotern with drawer, power outlet and light. One deep hip-top tool box with tote tray. Fluorescent study lamp, heavy duty welding card, 1 set welding gauges. Call J. E. Lepetich, 948-8002.

For Sale-Bathroom sink, porcelin, 21"x19", with wall mounting bracket, faucets & drain, $10. Also, window frame, louvered, metal, 26"x60", 17 glass louvers and window screen included, $10. Call 739-8973.

Missing-Mutimeter, Digital Fairchild, model 7050, decal No. 33656 and current source, Keithley 261 (Pico-ampers, standard) decal No. 30236. Call Sal Tardio, ext. 2925.

Car Pool-8 a.m. shift, would like to form or join a car pool from the Piedmont Hills area in San Jose. Call Chuck McClinton, 2308.

Wanted-Rider to share driving to Ames from vicinity of Hanchett Ave. in San Jose. 7:30 to 4:00 shift. Call John E. Maher, ext. 2258.

AIAA CONFERENCE

(Continued from Page 1)

dom to a three-man transport-type cab. The most dramatic feature of the FSAA is its unique 100-foot lateral travel. The paper describes the assigned hybrid-computer system, the visual-cue generation system, the aircraft-sound generator, and an onboard control force-feel system. Also discussed were the problem areas encountered in making the FSAA operational.